

**Amendments to the Claims:**

**Claims 1-19 (Cancelled)**

[20] **(New)** A plasma etching method of performing plasma etching to an object made of silicon in a treatment chamber, said plasma etching method comprising:

introducing, into the treatment chamber, etching gas which includes fluorine compound gas and rare gas; energizing the etching gas into plasma state by supplying electricity to the etching gas, the electricity having a frequency that is equal to or more than 27 MHz; and etching the object using the plasma.

[21] **(New)** The plasma etching method according to Claim 20,

wherein the etching gas further includes one of oxygen (O<sub>2</sub>) gas, carbon monoxide (CO) gas, and carbon dioxide (CO<sub>2</sub>) gas, and

the fluorine compound gas is sulfur hexafluoride (SF<sub>6</sub>) gas.

[22] **(New)** The plasma etching method according to Claim 21,

wherein the rare gas is helium (He) gas.

[23] **(New)** The plasma etching method according to Claim 22,

wherein a volume of the helium (He) gas introduced into the treatment chamber is equal to or more than 30% of a total flow rate of the etching gas.

[24] **(New)** The plasma etching method according to Claim 23,

wherein an inside wall of the treatment chamber is made of an insulating material.

[25] **(New)** The plasma etching method according to Claim 24,

wherein the insulating material is one of quartz, alumina, an aluminum matrix with alumite treatment, yttrium oxide, silicon carbide, and aluminum nitride.

[26] **(New)** The plasma etching method according to Claim 21,  
wherein the etching gas further includes chlorine (Cl<sub>2</sub>) gas.

[27] **(New)** The plasma etching method according to Claim 26,  
wherein a volume of the chlorine (Cl<sub>2</sub>) gas introduced into the treatment chamber is equal to or less than 10% of a total flow rate of the etching gas.

[28] **(New)** The plasma etching method according to Claim 20,  
wherein the fluorine compound gas is one of sulfur hexafluoride (SF<sub>6</sub>) gas and nitrogen trifluoride (NF<sub>3</sub>) gas.

[29] **(New)** The plasma etching method according to Claim 28,  
wherein the rare gas is helium (He) gas, and  
a volume of the helium (He) gas introduced into the treatment chamber is equal to or more than 80% of a total flow rate of the etching gas.

[30] **(New)** The plasma etching method according to Claim 20,  
wherein the etching gas further includes polymer forming gas, and  
the fluorine compound is sulfur hexafluoride (SF<sub>6</sub>) gas.

[31] **(New)** The plasma etching method according to Claim 30,  
wherein the polymer forming gas is one of octafluorocyclobutane (C<sub>4</sub>F<sub>8</sub>) gas,  
trifluoromethane (CHF<sub>3</sub>) gas, octafluorocyclopentene (C<sub>5</sub>F<sub>8</sub>) gas, and hexafluorobutadiene (C<sub>4</sub>F<sub>6</sub>) gas.

[32] **(New)** The plasma etching method according to Claim 20, comprising etching the object by using etching gas which includes one of oxygen (O<sub>2</sub>) gas, carbon monoxide (CO) gas, and carbon dioxide (CO<sub>2</sub>) gas, and uses sulfur hexafluoride (SF<sub>6</sub>) gas as the fluorine compound gas; and then further etching the object by using etching gas which includes polymer forming gas and uses sulfur hexafluoride (SF<sub>6</sub>) gas as the fluorine compound gas.

[33] **(New)** The plasma etching method according to Claim 20, wherein the etching gas is energized into plasma state by an inductively coupled plasma (ICP) method.

[34] **(New)** A device which etches a silicon substrate, said device forming a trench in the silicon substrate using the plasma etching method according to Claim 20.

[35] **(New)** A plasma etching method of performing plasma etching to an object made of silicon in a treatment chamber, said plasma etching method comprising: introducing, into the treatment chamber, etching gas which includes fluorine compound gas and rare gas; and etching the object by energizing the etching gas into plasma state, wherein the fluorine compound gas is tetrafluoroethane (CF<sub>4</sub>) gas, and accuracy of an etching depth is increased by lowering an etching rate more, as compared to when gas except tetrafluoroethane (CF<sub>4</sub>) gas is used as the fluorine compound gas.

[36] **(New)** The plasma etching method according to Claim 35, wherein the rare gas is Ar gas.

[37] **(New)** The plasma etching method according to Claim 36, wherein a volume of the Ar gas introduced into the treatment chamber is 50% to 90% of a total flow rate of the etching gas.